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## Hairdressers and Work-related Respiratory Disease

There are over one half-million hairdressers working in the United States and 23,000 licensed hairdressers in CT.<sup>1,2</sup> Hairdressers are exposed to many different chemicals in the workplace which can result in health problems, such as respiratory and skin disorders.<sup>3,4,5</sup> Approximately 20% of hairdressers leave the profession for health reasons.<sup>5</sup> This article will focus on respiratory diseases that affect the hairdressing profession, particularly occupational asthma and lung disease possibly associated with hair spray.

### Occupational Asthma

#### *Persulfates in Hair Bleaches*



Persulfate salts (sodium and potassium persulfate) in hair bleaches are known to cause occupational asthma as well as respiratory symptoms, allergic dermatitis and urticaria in hairdressers and workers in the chemical industry.<sup>3,5,6,7,8</sup> Hair bleaches dissolve the natural or artificial color in hair in order to lighten it. Persulfates are used as accelerants to speed up

the bleaching process. They are also used in chemical, pharmaceutical, textile, photography and food preservation industries.<sup>5,9</sup>

Hairdressers are exposed to persulfates through inhalation and through skin contact when mixing the bleaching powders with an oxidizing agent, like hydrogen peroxide, just before use. The mechanism by which persulfates cause asthma is unknown. Certain characteristics suggest an allergic pathogenesis, although no specific IgE or other specific serum immunoglobins against persulfates have been found.<sup>6,9</sup> In other cases, the mechanism was felt to be due to direct histamine liberation. In animal studies, mast cell preparations have shown that persulfate salts can cause the release of histamine directly. However, this does not explain why only some and not all of exposed individuals are affected.<sup>1,5,6</sup>

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## HEALTH ALERT

Recently, the Department of Public Health has received an increased number of reports of workers with **Hypersensitivity Pneumonitis (HP)** who work with **metal working fluids (MWFs)**. MWFs are used to cool and lubricate metal during operations such as grinding, stamping and cutting. MWF aerosols (especially from water based fluids) generated during these operations may contain bacteria, fungi and toxic metabolic byproducts (endotoxins, mycotoxins) that have been associated with HP in machinists and other workers who use MWFs. Chemicals in MWFs have also been linked to occupational asthma.

For more information on HP refer to the December 1997 *Occupational Airways*.

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## *Para-phenylenediamines in Permanent Hair Color*

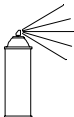
*Para*-phenylenediamine has been documented to cause occupational asthma.<sup>6,7,10</sup> It is also a known skin irritant and sensitizer.<sup>5,11,12</sup> *Para*-phenylenediamines are types of oxidation dye intermediates in permanent hair color. The oxidation dye intermediates produce colored dyes in the hair shaft when mixed with hydrogen peroxide. Hair colors may contain many different dyes and intermediates in order to achieve various shades.<sup>5,12</sup>

Permanent hair color comes in many forms such as liquids, creams, gels, shampoos and powders. When in powder form, exposure to dusts can occur when preparing the hair color solution. The mechanism by which amines cause asthma is unclear.<sup>7</sup>

## *Henna*

Henna, a natural reddish brown dye made from the leaves and roots of the mignonette tree, *Lawsonia inermis*, is a known asthmagen. Henna is found in some commercial hair coloring products and nail dyes. Henna is also referred to as Natural Orange-6, and its active coloring ingredient is 2-hydroxy 1,4-naphtha-quinone.<sup>1,12,13</sup> Exposure to henna occurs via inhalation while mixing or preparing the hair dye. In a case report by Starr et al, serum IgE antibodies against henna were demonstrated in two patients.<sup>13</sup>

## **Lung Disease and Hair spray**



Individuals who are exposed to hair spray repeatedly may be at risk of developing lung disease. One such condition is called thesaurosis. Thesaurosis is a poorly understood disease theorized to be caused by storage of nonbiodegradable macromolecules of polyvinyl pyrrolidone (PVP) or its copolymers in the lungs. PVP is a resin-like synthetic polymer used as a nonlacquer hair spray base. Chemical analyses of lung tissue have not found PVP, perhaps because it is water soluble. However, PVP has

been found in lesions in the lungs and lymph nodes. Some explain the presence of PAS positive staining intracytoplasmic granules in macrophages, lymph nodes and lung tissue as part of a sarcoidosis or other granulomatous disease process. Other diagnoses of lung disease due to hair sprays include DIPF (diffuse interstitial pulmonary fibrosis) and hilar adenopathy.<sup>4,5,10,12,14</sup>

Reported symptoms of hair spray associated lung disease have been nonspecific and include dyspnea upon exertion, cough and occasional fever. In some cases, symptoms were absent. Chest x-rays showed patchy or linear opacities and occasionally enlarged hilar lymph nodes. When exposure to hair spray ceased, the lesions regressed, usually within six months, but some cases took up to two years. Lung disease associated with hair spray is rare and its etiology is still uncertain.<sup>5,10,14</sup>

## **Discussion**



It is estimated that over 5000 chemicals are used in the manufacturing of beauty products around the world.<sup>12</sup> Besides the chemicals in the products discussed above, there are other ingredients in these products that may cause respiratory irritation and skin disorders. Permanent waves, hair relaxers, shampoos and conditioners also contain many respiratory irritants, skin irritants and sensitizers.<sup>11,12</sup> For hair salons that provide nail services, such as artificial nails and manicures, nail products come with additional hazards. The August 1997 issue of *Occupational Airways* focused on Nail salons.

Many hair salons are small and poorly ventilated. Ideally, the use of extraction hoods to mix bleaches and hair colors would reduce inhalation of dusts. Those with known sensitivity should avoid using offending products or substitute when possible. For example, there are other accelerants beside persulfate salts, such as sodium perborate, sodium percarbonate, and magnesium carbonate. Instead of permanent hair

color, semi-permanent hair color or vegetable dyes could be used. For hair sprays, pump sprays instead of aerosol cans and water based hair sprays could be used. To avoid adverse skin reactions, gloves should be worn when applying hair colors, bleaches, permanent wave solution and hair relaxers. Hairdressers should be advised to request the product's Material Safety Data Sheet (MSDS) for a listing of the product's health hazards, hazardous ingredients and the control measures, such as the type of glove recommended.

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Connecticut Department of Public Health  
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**OSHA  
 Occupational Safety & Health  
 Administration**

**What is OSHA?**

The Occupational Safety & Health Administration (OSHA) is a federal agency within the U.S. Department of Labor. It is responsible for protecting the health and safety of workers by identifying workplace hazards and requiring employers to correct them. OSHA was created from the passage of the Occupational Safety and Health Act (OSHAct) in 1970.

**What does OSHA do?**



- Creates and enforces workplace standards
- Inspects work sites
- Issues citations to employers who do not meet the workplace standards
- Enforces the general duty clause, which requires employers to provide safe working conditions to workers even where no specific hazard exists
- Offers a free consultation program for public & private sector employers through state plans
- Enforces workers rights and antidiscrimination provisions of the OSHAct.
- Establishes reporting and record keeping procedures in the workplace to monitor job-related injuries and illnesses (OSHA 200 logs)
- Protects the health & safety of workers

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<b>Summary of Number of Reported Cases of Selected Respiratory Diseases in CT</b>					
<b>CT DPH Occupational Disease Surveillance Data</b>					
	1995	1996	1997	1998*	ODSS Total**
<b>Asthma</b>	34	33	26	6	153
<b>RADS***</b>	1	5	4	1	18
<b>Silicosis</b>	1	0	1	1	9
<b>Asbestosis</b>	5	10	3	1	49
<b>Asbestos-related pleural diseases</b>	8	7	2	4	129
<b>Total</b>	49	55	36	13	358

\* As of June 30, 1998. Data subject to change.

\*\* Occupational Disease Surveillance System (ODSS) total since 11/91

\*\*\* Reactive Airways Dysfunction Syndrome

TO:

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### What is Connecticut OSHA?



Under the OSHAct, states can develop and operate their own occupational health and safety programs. Connecticut is one of 25 states that has a state program called Connecticut OSHA or CONN-OSHA. As in NY, CT's state program enforces safety and health standards only in **public** sector (state and municipal) workplaces, whereas Federal OSHA enforces safety and health standards in **private** sector workplaces. CONN-OSHA and Federal OSHA are administered separately. However, the state regulations must be at least as stringent as the federal regulations. In addition, CONN-OSHA offers free safety and industrial hygiene consulting services to both public and private sector workplaces.

CONN-OSHA is housed at the CT Department of Labor in Wethersfield. There are two Federal OSHA offices in CT, in Hartford and Bridgeport. The Bridgeport office covers Fairfield, New Haven and Middlesex counties while the Hartford office covers the rest of the state.

**REMINDER :**  
REPORT 1998 CASES OF  
OCCUPATIONAL DISEASE NOW

Both the federal and state OSHA programs are valuable resources for information on workers' rights, industrial hazards and safe clean-up procedures, work practices, ergonomics, personal protective equipment, hazardous materials handling, and bloodborne pathogens, to list a few. OSHA should be alerted when there is a known hazard in a workplace and workers are being injured or becoming ill.

For more information on OSHA or CONN-OSHA, call the numbers below.

Federal OSHA (Hartford): 860/240-3152  
Federal OSHA (Bridgeport): 203/579-5581  
CONN-OSHA: 860/566-4550

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Occupational Airways is produced by the Occupational Health & Special Projects Program, Division of Environmental Epidemiology & Occupational Health, Connecticut Department of Public Health.

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